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ABSTRACT

This paper reports on a survey of 221 small-scale farmers conducted in 5 western states. Despite the current productive dominance of large farms, an argument can be made that small-scale farming is desirable both for social and ecological reasons. Discussion focuses on the tradition-oriented goals and values of small-scale farmers, special problems associated with smallness of scale, diverse sources of income, cost-minimization and risk reduction strategies, and determinants of financial viability. Results indicate that there are economic penalties attached to heavy investments of time and resources by respondents who attempt to make a living primarily by farming. In most cases nonfarm sources of income are necessary to offset insufficient farm income and provide the bulk of the support for the household. It is concluded that institutional change should be directed toward increasing the financial rewards for farming on a small scale rather than encouraging farmers to incur the risks associated with expanded scale of operation. Six appendices with a total of 34 tables conclude the document. (Author/BRR)

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A Niche for Small-Scale Farmers

Report of a Five-State Survey

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Abstract

This paper reports on a survey of 221 small-scale farmers conducted in five western states. Despite the current productive dominance of large farms, an argument can be made that small-scale farming is desirable both for social and ecological reasons. Discussion focuses on the tradition-oriented goals and values of small-scale farmers, special problems associated with smallness of scale, diverse sources of income, cost-minimization and risk reduction strategies, and determinants of financial viability. Results indicate that there are economic penalties attached to heavy investments of time and resources by respondents who attempt to make a living primarily by farming. In most cases nonfarm sources of income are necessary to offset insufficient farm income and provide the bulk of the support for the household. It is concluded that institutional change should be directed toward increasing the financial rewards for farming on a small scale rather than encouraging farmers to incur the risks associated with expanded scale of operation.

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Social Goals and Farm Policy

During the last few decades, Americans have witnessed technological developments that have drastically changed farming practices and reduced the need for labor. No one can dispute that the effort to improve labor efficiency has met with great success. Since 1950, for example, the number of people fed per farm worker has trippled. The social consequences of labor-saving changes in agricultural technology are obvious and familiar--increasing farm size, accelerating farm debt, a decreasing number of small farm operators, loss of rural population, unemployment, and the stagnation and decline of rural communities. These problems are discussed in a number of publications including Merrill (1976), Perelman (1977), California State CETA Office (1977), Goldschmidt (1978), Jorgensen et al. (1978), Rodefeld et al. (1978), Moles (1979), and Young and Newton (1980). Often such social costs are regarded as mere side effects--a small price to pay for progress. This view is expressed by agronomist Boysie Day:

> The morality of agronomy is to produce...I fear that when his (the agronomist's) ethic comes in conflict with questions of political expedience, social justice and equity, the production ethic takes precedence...Such is the stuff of revolutions. I have enjoyed my part in it (the technological and social revolution in agriculture) and have no regrets. So I say, three cheers for productivity and long live the revolution. (Day, 1977)

Others do not agree with the notion that production should always take precedence. An opposing view is expressed by anthropologist Frank Cancian:

> ...We have reached a crisis of confidence with regard to hard-nosed, unambiguous, powerful scientific approaches to problems...technological problems cannot be separated from social problems except in the affirmation that social goals are primary...It is time..to uncover the fantasy and self-delusion that permits technological goals to dominate human goals in a world of human beings. (Cancian, 1977)

The technological revolution in agriculture has most essentially been based on innovations which allow the substitution of fossil fuels for human and animal labor. All phases of agricultural production--including the use of heavy machines in the fields,

the manufacture of chemicals and fertilizers, food processing, packaging, and transportation to markets--use 6 calories of fossil fuel energy for every calorie of food energy that is produced (Perelman, 1977). The traditional Chinese system of wet rice agriculture is 300 times more efficient in using energy. It has been estimated that if all nations of the world were to adopt the U.S. food system, it would take 80 percent of the world's current energy expenditures just to produce and market food (Steinhart and Steinhart, 1974). It is certain that a worldwide shortage of petroleum and rapidly rising fuel prices will eventually have a severe effect on this system of food production. Production costs have already begun to rise steeply. For example, between 1969 and 1974 farm fuel costs rose 69 percent, while the cost of fertilizers rose 139 percent (1974 U.S. Census of Agriculture). Since 1974, these costs have continued to rise and have been reflected, along with other factors such as high interest rates on loans, high costs for machinery repairs, and high rates of inflation, in the cost of food to the consumer. Between April of 1979 and April of 1980 fuel and energy costs increased 56 percent, and the cost of fertilizer increased 29 percent (USDA Agriculture Prices, April, 1980).

The present high degree of dependence on fossil fuels was fostered in the past by their seeming endless availability and artificially low prices. The time required for environmental constraints to manifest themselves in pricing structure was sufficient to allow intensive dependence to develop. Now that the cost of nonrenewable resources is increasing, we must show more concern for how productivity is achieved and place the least possible demand on scarce resources rather than increase labor efficiency per se. In fact, Hall and LeVeen (1978) suggest that there are ways to achieve efficiency in farming other than the use of labor-saving technology. If other types of efficiency are sought, the trend in which fewer and fewer farmers are able to feed more and more other people may come to an end. In this event, the skills and knowledge of the small-scale farmer should become increasingly important in experimenting with approaches that are less capital-intensive than the current norm.

Although large farms with more than $40,000 gross sales account for approximately four-fifths of food production in the United States, small farms account for four-fifths of the total number of farms. While the number of midsized farms continues to decline, there is a resurgence of farming on very small acreages. Between 1969 and 1974, the number of farms

with 1 to 49 acres increased by 24 percent (1974 U.S. Census of Agriculture). This change may reflect an increased interest in farming as a supplementary subsistance activity. The prohibitive costs in purchasing land and productive resources mean that farming larger acreages is not a viable option for most would-be operators. Accordingly, an increasing number of very small farms has not affected the long term trend in which smaller farms account for an ever-decreasing share of the nation's farm product sales.

One explanation for the productive dominance of large farms has been offered by former Secretary of Agriculture, Bob Berglund:

> ...Public policy that was supposed to help efficient small farmers hang in there and make a living appears to be working more to the advantage of the big farmer...(Berglund, 1979)

When this statement was made, the U.S. Department of Agriculture was undertaking a review of policy influences in the structure of agricultural industry. Again, in the words of Berglund, the review was regarded as important because "...we have never tried to determine the kind of agricultural industry we would like to have." Concern for the problems of small-scale farmers, at least in a programatic or prescriptive manner, has been expressed in several USDA and Land Grant publications. These studies include Horne (no date), Ad Hoc Committee on Small Farms (1979), University of Missouri-Columbia and M.G. Johnye D. Perry Foundation (1978), and USDA (1979). Friedland and Kappel (1979) have gone further to suggest specific social goals that could be incorporated into farm policy and implemented in Experiment Station research programs. Despite much interest shown, however, a detailed understanding of the goals, values, and adaptations of small-scale farmers has not been achieved. In order to contribute to such an understanding, the intensive study of small-scale farmers on which this paper is based was undertaken in the summer of 1978. Other studies associated with this project include Young and Caday (1979), Anderson (1980), Eastman et al. (1979), and Williams (1980).

Sampling Procedure

The data on small-scale farmers reported in this paper were collected from 12 counties in 5 western states. Information on the location and size of each sample is provided in Table 1.

Table 1

Sample of Small-Scale Farmers

State	County	Sample Size
Colorado	Weld	56
Hawaii	Oahu, Maui	40
Montana	Ravalli, Flathead, Gallatin	43
New Mexico	San Miguel, Mora, Taos, Rio Arriba, Santa Fe	38
Oregon	Polk	44
	TOTAL	221

Guidelines for sample selection included gross farm product sales between $1,000 and $40,000, either for 1977 or for a normal year. As more detailed information was obtained in subsequent interviews, however, it became clear that the product sales of some respondents were outside of this range, i.e., 4 percent were over and 11 percent were under the guidelines. Another sampling guideline, slightly exceeded in 11 percent of the cases, was nonfarm income estimated at no more than $20,000 per year. Two further qualifications were that respondents live on their farms and have acted as the farm operator for at least 1 year. With the exception of several respondents in Hawaii who resided away from their farms, these qualifications were met. The only other stipulation followed in all five states was to select a wide variety of farm types based on size and product mix within the sampled area. Indentification of respondents in a purposive manner was the responsibility of five different investigators and was accomplished by different means in each state. A random sample was not possible, because no uniform established universe of small-scale farmers could be identified without exhaustive and expensive effort. Percentages reported in this study, therefore, refer to the 221 cases in this sample and are not meant to be representative of a state or regional population. The sample was kept small by deliberate design in

order to allow interviewers more time to spend with each respondent. Intensive and detailed interviews were conducted in order to obtain a well-rounded picture of each individual's circumstances.

Demographic Characteristics

The farms represented in this study were found to produce a wide variety of products. The most frequently listed main products were beef (29 percent), vegetables (24 percent), and orchard crops (24 percent). On the average, respondents owned 141 acres and operated 235 acres. The range in farm size went from less than 1 acre in some cases in Hawaii to more than 1,000 acres in some cases in New Mexico. Approximately one-fourth of the land was in crops and three-fourths in pasture.

The average age of respondents was 49 years. Thirty percent fell into the range of 46 to 55 years of age. Women were identified as farm operators in one-fourth of the cases, although about half were considered joint operators along with their husbands. About one-third of the respondents were ethnic minorities, mostly Asian-Americans in Hawaii and Mexican-Americans in New Mexico. Educational background varied widely, as about one-third had 1 or more years of college, one-third were high school graduates, and one-third had less than a high school education.

More than half of the respondents were raised in the same county where they were farming. Five-sixths were raised in a small town or a rural setting as opposed to a larger ubran center, and four-fifths were raised on a farm. It is particularly interesting to note, however, that three-fourths began operating their farms after pursuing another (nonfarm) occupation. During their adult lifetimes, an average period of 31 years, they spent an average of only 17 years operating their farms. Thus, the life histories of respondents typically indicate a predominantly rural or farm background, a period of time spent in a nonfarm occupation, and finally a move back into farming.

Goals, Values, and Opinions

When asked about their reasons for being in farming, four-fifths of the respondents indicated that one of their goals was to live on a farm. Almost half regarded this as their most important goal. Other related goals of a noneconomic type were also mentioned as important; these included raising children on a farm (11 percent), growing things (9 percent), independence (10 percent), seclusion (5 per-

cent), or simply doing farm work as a hobby (14 percent). Although one-fourth included acquiring wealth as one among several objectives, only 2 percent said that their primary purpose in farming was to pursue this goal.

The aspect of farm life most liked by the greatest percentage of farm operators was independence (41 percent). As one Colorado farmer put it, "I don't want nobody breathing down my neck telling me what to do and how to do it." Another most-liked aspect of farm life was farm work (20 percent). A number of respondents freely stated that they liked roping cattle, driving their tractors, plowing fields, and watching things grow. A few even expressed reservations about time-saving devices that would "take all the fun out of farming." Other aspects of farm life rated as most-liked were clean environment (17 percent), and peace and quiet (10 percent).

To an overwhelming degree operators agreed with statements expressing a strong rural value orientation, such as "Farming in this country should be preserved as a way of life" (95 percent); "Operating a small farm is a way of maintaining independence and freedom" (89 percent); and "Family farming instills moral values not commonly found in other occupations" (85 percent). Thus, it was found that respondents place high value on various aspects of farm lifestyle.[1]

Low returns for product sales, high production cost, and the need for better marketing structures were identified as important problems facing small-scale farmers. The government tended to receive much criticism and was itself considered to be a problem. Almost three-fifths of the respondents considered the government to be a main source of problems. A similar percentage agreed that the world is run by a few powerful people, and that "the little guy" can do little about it. Half thought that public officials were not really interested in the problems of the average man. Moreover, only about one-fourth expressed actual disagreement with these opinions.

Evidence obtained in open-ended discussions suggested that antigovernment sentiment may also be related to the exercise of control over "what the farmer does with his own farm." Grievances were related to:

- social security regulations that do not make allowances for fluctuating farm income;

- inheritance taxes;
- property taxes which were perceived as a penalty for making farm improvements;
- being too small to qualify for Agriculture Stabilization and Conservation Service funds;
- building permits being granted to large-scale farmers in violation of zoning laws;
- regulations on ages and camping accomodations for short term pickers;
- arbitrary electrical and plumbing inspections by the Occupational Safety and Health Administration;
- lack of assistance on weed and pest control programs;
- public water projects diverted to residential developments and failing to serve farmers as originally intended;
- lack of legal protection against land fraud;
- being sold poisoned feed by a supplier;
- filling out crop reports thought to be used to manipulate markets against their interests; and
- restrictions on land use and sales.

Some respondents felt that it would be useful for small-scale farmers to organize their problem-solving efforts. The diversity and individualism found among respondents, however, would tend to inhibit cooperation. In the words of one Colorado respondent, "Heck, farmers are so independent you couldn't get two of them to agree where to put a fence post."

Sources of Income

The primary source of farm revenue for respondents in 1977 was either crop sales (an average of $4,310 per farm) or livestock sales (an average of $4,118 per farm). Total gross income from product sales before taxes averaged $12,419, while gross income not from product sales (i.e. rentals, custom work, government payments, etc.) averaged $1,230. In the calculation of net gains and losses, however, farm expenses exceeded farm income by an average of $1,059[2] and 54 percent of the respondents reported a net loss. The average value of farm assets if sold

was approximately a quarter of a million dollars. Rather than sell their farms, however, many respondents subsidized the farm operation with income from nonfarm work. One respondent of Hawaiian ancestry owned land valued at $850,000 and sold only $2,000 worth of cattle in 1977 while incurring expenses of more than $6,000. Despite suffering financial losses, he expressed strong attachment to the land and the way of life, indicating that he would never think of giving up his farm.

In 1977 full-time jobs other than farming were held by almost one-third of the operators, and one-fourth of the spouses worked in nonfarm jobs involving one-fourth to three-fourths of their time. In some cases nonfarm jobs complimented farm activities. For example, a pig farmer in Hawaii drove a garbage truck and used the garbage to feed his pigs. Several of his competitors without this advantage had recently gone out of business.

In accord with their interest in pursuing a farm lifestyle, two-thirds of the operators and two-fifths of the spouses said that if possible, they would prefer to work exclusively on the farm. More than two fifths of the operators and one-sixth of the spouses indicated that nonfarm work interfered with their duties on the farm. However, five-sixths of the operators and well over half of the spouses considered the income they earned to be a necessary supplement to farm income. Income derived from nonfarm wage labor and home-based businesses averaged $4,317 for operators and $3,105 for spouses. Other important sources of income, particularly for elderly and retired persons, were social security, pensions, and annuities. One-fifth of the households received income from one or more of these sources, and one-eighth received as much as $5,000 to $10,000. A few respondents received additional income from rents and investments. Altogether, net nonfarm income averaged $11,221. Thus, despite negative net farm income, net household income averaged $9,640.

Mode of Operation

Respondents tended to reduce their vulnerability to forces operating in the economy at large by keeping a low debt profile. On the average, yearly debt payments were only $4,087, and this figure is distorted upward by 11 percent of the respondents who had payments over $10,000 per year. More than one-third reported making no debt payments at all in 1977. It was found that well over half of the respondents had no mortgages; two thirds had no loans for machinery or equipment; and four-fifths had no

production loans. In all but 3 or 4 percent of the cases, the loans and mortgages held by respondents seemed small enough not to constitute a disaster if prices for farm commodities failed to measure up to expectation. A number of respondents indicated in open-ended discussion that staying out of debt was indeed an important part of their operating strategy, and they did not want to risk losing their farms due to forced sale or bank foreclosure.[3]

A high degree of self-reliance was exhibited by many respondents. On the average, they reported obtaining 37 percent of their food from their own farms and gardens, performing 83 percent of their own maintenance and repairs on buildings, and personally taking care of 78 percent of repairs on machinery and vehicles. Used equipment was often purchased as a means of economizing. Some took special pride in keeping 20- to 30- year-old tractors in good running condition. Four-fifths of the respondents saved on costs by canning or freezing food; half spread manure from livestock on their fields; and half produced hay to be kept and fed to animals.

For the most part, farm labor was provided by operators and spouses, with little reliance placed on hired labor. More than half the operators and one-fourth of the spouses worked full time in farming in 1977. All but one-sixth of the spouses reported at least a minimal amount of farm work. Four-fifths of the respondents brought in no hired labor at all in 1977, and only 4 percent reported hiring the equivalent of more than one person per year of labor. Additional savings obtained from exchanging labor with neighbors was realized by almost two-fifths of the respondents. The general notion held by respondents was that they were committed to doing their own labor. Hired workers were regarded as quite unreliable and to be avoided if possible.

Most marketing was done by the farmers themselves, either direct to consumers, to local buyers, or through a livestock auction. These outlets were heavily relied upon respectively by 27 percent, 30 percent, and 28 percent of the respondents. Only 16 percent were committed to a prior contract with a company, and only 14 percent sold through a marketing cooperative.

Gathering of information also tended to be done in an individualistic manner, emphasizing personal as opposed to institutional channels. Important sources of information were mentioned as follows: past experience (71 percent); friends and neighbors (30 percent); one's own experimentation (29 percent);

farm publications (16 percent); county agent (12 percent); and commercial salesmen (8 percent).

Farming Strategies and Income

The analysis of different farming strategies reveals that operators and spouses who spend less time in farming and more time doing nonfarm work have higher net household incomes, whereas those who spend more time in farming and less time doing nonfarm work have lower net household incomes (Table 2). Although operator's time spent farming has a small effect on increasing net farm income, it is not nearly enough to offset the loss of income that could be gained from time spent in nonfarm work. Other variables indicating a greater commitment to farming--such as amount of production loan, acres operated, and only skill was farming--are similarly associated with lower net household income. These results suggest that great commitment of time, skill, and scale of operation are made only with the sacrifice of financial resources otherwise needed to support the household.

Table 2

The Effect of Time and Resource Management on Net Farm and Net Household Income [a]

Factor	Net household income	Net farm income
Operator's time in farm work	-.33	.16[c]
Spouse's time in farm work	-.25	N.S.
Operator's time in nonfarm work	.27	.25
Spouse's time in nonfarm work	.18[b]	N.S.
Amount of production loan	-.23	-.12[c]
Acres operated	-.22	N.S.
Only skill is farming	-.20[b]	.21[b]
Total farm debt payment	N.S.	-.37
Amount of mortgage	N.S.	-.28

a. $p < .001$, using Spearman Rank Order Correlation Coefficient.
b. $p < .01$.
c. $p < .05$.

Another finding is that total farm debt payments and amount of mortgage are negatively related to net farm income. Neither of these variables, however, is significantly related to net household income. This result indicates that investment which leads to higher farm debts does not pay off in re-

turned revenue from the farm operation, and that such debts are being covered by higher levels of nonfarm income. Thus, a strategy of farming designed to avoid indebtedness while supporting the farm with income from nonfarm sources is a "rational" choice aimed at minimizing risk and maintaining adequate levels of household income. In sum, small-scale farmers tend to farm in such a way as to bring personal satisfaction but to not create an excessive financial burden.

Additional variables dealing with experience and education were examined in relationship to net farm and household income (Table 3). Net farm income is strongly correlated to years operating the farm and to age, and weakly correlated to living in the same county before age 18. These results indicate that experience counts heavily in successfully operating a small farm. Formal education, however, shows a negative relationship to net income. This result can be explained by the fact that younger people with less experience in farming tend to have received more formal education. General education background per se would have little to do with knowledge and success in farming. Further analysis using partial correlations reveals that the negative relationsnip between education and net farm income totally disappears when controlling for age.

Table 3

The Effect of Experience and Education on Net Farm and Net Household Income

Factor	Net farm income coefficient[a] sig.	Net household income coefficient sig.
Years operating farm	.39	N.S.
Age	.31	N.S.
Lived in same county before age 18	.19[b]	N.S.
Education	-.23[c]	N.S.

a. $p<.001$, using Spearman Rank Order Correlation Coefficient.
b. $p<.005$.
c. Spurious correlations due to the intervening effect of age.

Although debts tend to be higher for new farmers, debt payments and length of time operating the farm are separately correlated to net farm income. When controlling for length of time operating the farm, the partial correlation between debt payments and net farm income is -.18 sig. .05. When controlling for debt payments, the partial correlation between length of time operating the farm and net farm income is .20 sig. .01. The separate effects here indicate that a combined strategy of staying out of debt and simply using time to gain experience is the most sensible approach to small-scale farming for the respondents in the study.

Variation by Farm Type

The following classification of small farm types is inductive, as it is based on the analysis of 10 variables, each showing a meaningful range of variation and representing different aspects of farming strategy found to be important in this study. These 10 variables are described as follows:

1. amount of time devoted to farming;
2. amount of income obtained from operator's and spouse's nonfarm work or family business;
3. percent of food consumed from the family farm and garden;
4. extent of reliance on information from friends and neighbors;
5. extent of marketing directly to consumers;
6. number of types of crops and livestock;
7. cost of fertilizers and sprays as a percent of total farm costs;
8. market value of machines used in the farm operation;
9. farm-related debt payments; and
10. gross farm income from product sales.

The statistical technique called cluster analysis was used to cluster or group cases into several different categories or classes, i.e. farm types. Similarity of response on the 10 variables served as the basis upon which the classes were formed. Missing data in the record of some cases meant that not all 221 cases could be classified. Altogether, 193 cases were

grouped hierarchically into 10 distinct classes. The relationships among the 10 classes and the number of cases assigned to each class are shown in Figure 1.

Distinguishing features of the 10 classes and their higher order associations were determined by analysis of variance across the classes (Table 4). Significant differences between the classes were discovered for nine of the variables used in the cluster analysis as well as for a number of other important variables encompassing demographic characteristics and farming strategies.

The most revealing variables differentiating among the 10 classes of farms are:

- capital intensiveness;
- time spent farming;
- size of acreage operated;
- amount of income from nonfarm work;
- home consumption vs. direct marketing;
- amount of product sales;
- age/experience; and
- indebtedness.

Results here indicate that variations in farming strategies cannot be explained exclusively as a function of scale of operation or stage in the life cycle. For example, capital-intensive farmers are not necessarily those with the largest acreage or the highest product sales, and farmers of similar ages may be quite different in their ways of deriving income, both on and off the farm. One striking feature of these results is that different mixes of farming strategies produce significant differences in net household income but no significant differences in net farm income. Thus, as far as net farm income is concerned, there appears to be no approach that is much better than any other. However, the different approaches affect net household income in at least two important ways--those who spend the most time in and derive the most income from nonfarm work (class 2 and class 5) have the highest household incomes, and those who devote the most time and skill to farming and record the highest product sales (class 9 and class 10) have the lowest household incomes. The worst circumstance is that of class 9 where high

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Table 4

Analysis of Variance Across Ten Classes of Small-Scale Farmers

Class	Commercial fertilizer as a percent of total farm costs in 1977*	Current market value of farm machinery*	Amount of time operator devoted to farming in 1977* 5=max, 0=none	Amount of time spouse devoted to farming in 1977 5=max, 0=none	Amount of time operator devoted to nonfarm work in 1977 5=max, 0=none	Amount of time spouse devoted to nonfarm work in 1977 5=max, 0=none	Operator's and spouse's income from nonfarm work and family business in 1977*	Total acres operated	Percent of food consumed from the family farm and garden*	Extent of marketing direct to consumer* 3=max, 0=none
#1	15.71	27059.61	4.07	2.88	2.50	1.76	8197.94	245.81	43.03	1.55
#2	4.38	8050.00	2.72	2.11	4.16	2.83	19439.61	58.86	65.16	1.50
#3	6.44	5935.29	2.52	1.52	1.94	1.35	1882.52	84.19	55.35	1.70
#4	1.66	4665.62	4.50	2.06	2.18	2.53	7072.12	117.92	[illegible]68	2.81
#5	2.69	10105.26	2.52	1.57	4.27	3.50	17985.36	183.22	13.42	0.52
#6	2.33	19464.28	5.00	3.00	2.35	2.38	7087.50	142.92	50.35	0.50
#7	5.06	15602.17	4.95	2.86	1.34	2.54	2706.52	252.91	18.26	0.69
#8	2.27	9787.50	4.66	2.18	1.75	2.33	4579.16	103.62	14.00	0.08
#9	4.03	25681.77	5.00	4.00	1.55	1.66	1059.44	973.11	38.88	0.0
#10	2.30	20001.92	4.92	3.23	1.00	2.07	870.61	197.15	36.53	0.15
Overall mean	6.86	16370.52	4.00	2.53	2.40	2.24	7773.90	212.56	37.13	1.12
F	3.09	6.01	28.50	4.16	9.46	2.92	19.03	4.76	9.25	10.84
Sig.	p<.0001	p<.0001	p<.0001	p<.0001	p<.0001	p<.01	p<.0001	p<.0001	p<.0001	p<.0001

* Indicates variable used in cluster analysis.

Table 4 (continued)

Class	Extent of reliance on information from friends and neighbors* 3=max, 0=none	Gross income from product sales in 1977*	Farming is the only skill 1=yes, 0-no	Age of operator	Number of years operating this farm	Operator is retired from nonfarm occupation	Income from social security, pension, or annuity in 1977	Total payment on farm debts in 1977*	Net farm income in 1977	Household total net income in 1977
#1	1.50	17849.38	0.32	46.84	16.36	0.09	873.09	7463.05	-1685.71	8363.60
#2	2.16	4041.00	0.0	40.61	9.88	0.0	222.22	2624.55	-3069.83	17479.35
#3	1.23	2740.70	0.0	61.64	22.76	0.64	4128.00	191.76	144.70	7616.80
#4	2.56	7514.43	0.18	48.87	15.62	0.31	2141.18	1786.25	-517.66	9513.20
#5	1.15	4603.94	0.0	43.94	12.05	0.05	607.05	3852.52	-2837.94	17949.23
#6	1.64	9157.64	0.14	46.42	11.42	0.14	626.85	4676.50	-2675.92	7426.00
#7	0.26	8993.34	0.43	60.13	30.00	0.30	1881.65	1586.17	1249.18	9056.22
#8	2.50	8021.58	0.08	44.66	14.50	0.25	1152.33	1412.50	76.10	8135.40
#9	0.88	28434.33	0.55	48.88	21.62	0.0	0.0	13592.88	-5559.44	-5901.62
#10	1.92	35889.46	0.53	44.84	12.69	0.23	0.0	2914.76	1473.07	3539.69
Overall mean	1.51	12481.80	0.23	48.42	16.96	0.19	1204.43	4246.06	-1250.46	9184.94
F	8.43	15.36	5.07	6.62	5.25	5.02	4.45	8.40	0.35	2.46
Sig.	p<.0001	p<.0001	p<.0001	p<.0001	p<.0001	p<.0001	p<.0001	p<.0001	N.S.	p<.05

*Indicates variable used in cluster analysis.

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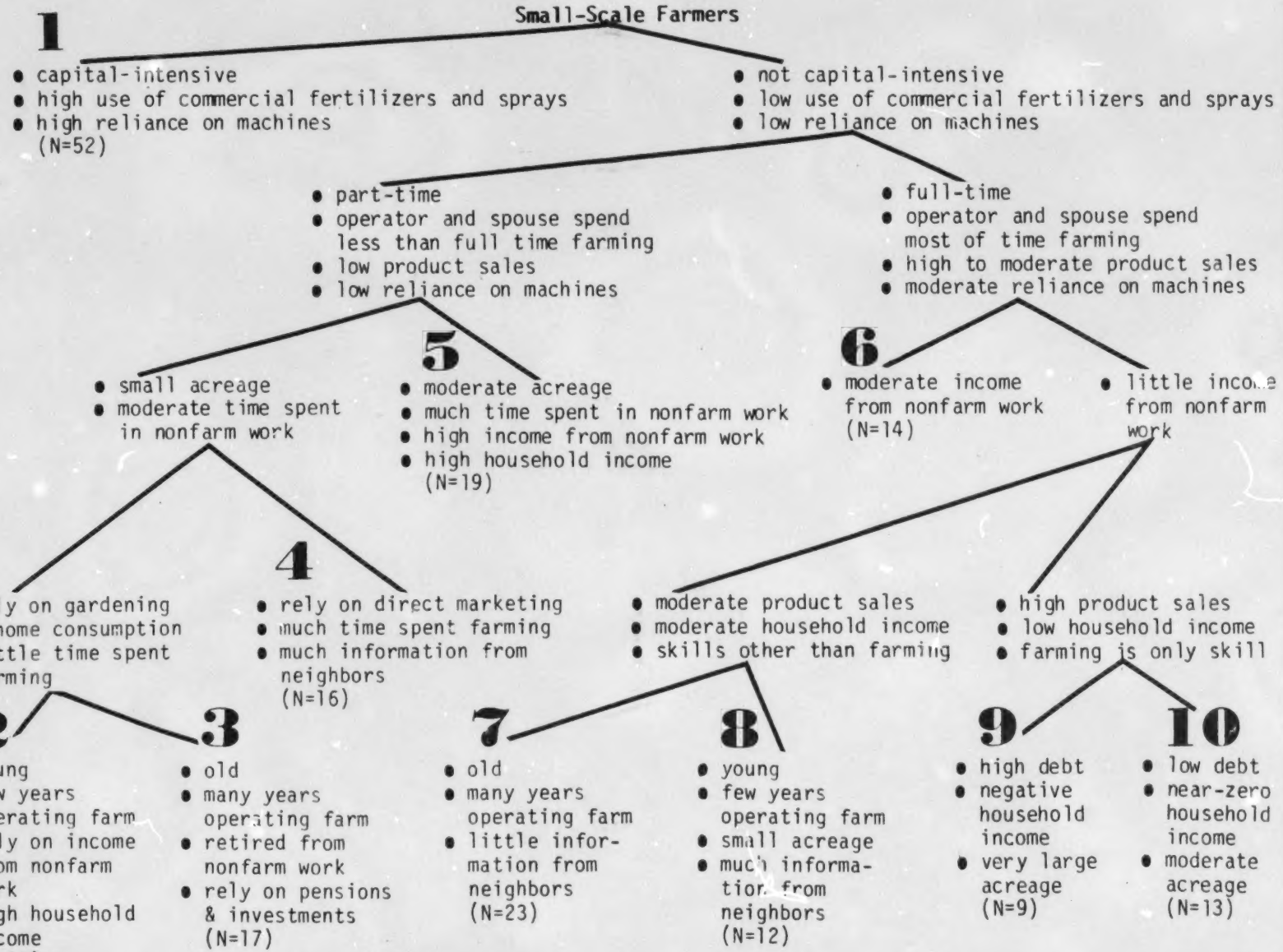
Figure 1
Ten Classes (Types) of Small-Scale Farmers From Five-State Sample
(N=193)



debts seriously threaten financial viability. These findings are consistent with the correlational results obtained for the full sample of 221.

It is clear that the small-scale farmers intent on farming for a living have little hope of financial success. The future will likely bring a continuing decrease in the number of such farms, while at the same time very small farms supported in various measure with nonfarm sources of income will show a concomitant increase. The latter, though perhaps not paying their own way, can be considered successful adaptations to limited opportunities in farming. In fact, it can be argued that these part-time farmers are the only hope if small-scale farming is to be preserved in the wake of increasingly depersonalized large-scale industrial agriculture.

Economics of Small Scale and the Small-Scale Economy

In essence, small farms and large farms are situated in separate economies. As the large-farm, energy-intensive, nonlocal economy has expanded over the last several decades, the small-farm, labor-intensive, local economy has weakened. The traditional small-scale farmer has been forced to choose among several options: move up in scale in order to participate in the large-farm economy; farm only with limited investments of time and capital; or give up farming altogether. Respondents in this study not only make limited investments but have limited objectives as well. In their emphasis on marketing through local channels, most are not attempting to compete in the large-farm economy, that is in national and international networks of distribution. For example, more than three-fifths of the respondents did not feel that competition from large farms presented a problem, while the remainder who did feel this way tended to be operating on a somewhat larger scale.[4]

Farm policy in the past has assumed that the solution for the limited-resource farmer was either to increase the capital intensiveness and scale of operation or else go out of business (Young and Newton, 1980). Most respondents in this study, however, seem adapted to the small-farm economy and certainly would not voluntarily choose either of these solutions. Three-fourths of the respondents indicated that the problems of large-scale farmers were different from their own. Some even expressed pity for large-scale farmers because of their indebtedness to banks, difficulties with hired labor, and ultimate dependency on government to bail them

out of a financial crisis. Thus, small-scale farmers should not be expected to place their independent lifestyle in jeopardy by attempting to compete in the large-farm economy. The most realistic approach to their needs would be to increase opportunities existing in the small-farm economy itself. Improved opportunities would have the effect of increasing both the number and viability of part-time operations partially dependent on nonfarm sources of income. Dependence on nonfarm sources of income might eventually be reduced, but in the short run it must be recognized as a necessary aspect of a financially viable small-farm enterprise.

Stimulating growth in the small-farm economy would not require massive capital investments of credit programs aimed at expansion. Instead, credit could be extended in small amounts for inexpensive projects intended to increase efficiency and provide relatively short term payback, perhaps about 3 to 5 years. Such projects might include installations to produce solar or wind power, the development of better methods of recycling animal waste onto fields, introduction of biological controls for insect pests, and efforts to conserve fuel in planting and harvesting practices. Local and direct markets could be developed by emphasizing specialty products, cost savings to the consumer, and advantages to be gained in taste and nutrition from fresh food products. Organizing consumer groups in the community to purchase local farm products and consumer education would be important in this regard.

These recommendations are consistent not only with the goals of small-scale farmers to achieve greater self-reliance and minimize risk, but also with the general social goal of achieving greater efficiency in using resources for the overall food production and distribution system. Savings could be realized by making greater use of renewable sources of energy and fertilization, while reducing the wasteful demand for energy in processing, packaging, and transporting food products to distant markets. The implication here is that an energy-efficient small-farm economy would, at least to some degree, increase in importance relative to the energy-intensive large-farm economy in order to achieve these ends. In the final analysis, there should be no disagreement about the goal of increasing production as long as the social and ecological effects of technological change are considered in deciding upon the kind of agriculture that will best serve all of our needs.

Notes

1. Statements expressing goals and values related to farming are taken from interviews with small-scale farmers in the context of previous studies conducted by the author.

2. In estimating net income, attention was given to cash flows. Cash costs for machinery repairs, labor, and capital investments were spread over several years, and mortgage costs were treated as interest payments. The latter estimate was largely true, as the original average mortgage loan was $22,632 and the average current level of principal remaining was $20,411 among the farmers studied. Effectively, the focus was on identifying disposable family income for 1977. It is true that the wealth position of respondents was improving with payments on mortgage principal or upgrading buildings and equipment, but the research interest was the flow of family income. Depreciation allowances were not considered, since this tax mechanism is only of significant benefit to larger farmers with higher incomes. Increasing net worth was not counted as income, because it does not affect the annual cash flow significantly; also, there was no evidence that the small-scale farmers in this study intended to take the capital gains by selling the assets held.

3. Large-scale farmers often find themselves caught in a perpetual problem of increasing debt. Expansion and borrowing will be allowed to continue as long as appreciation on farm property is sufficient to cover the debt. USDA reports that total farm debt rose from $137.5 billion in January of 1979 to $161.8 billion in January of 1980, with 53 percent of the total accounted for by real estate loans.

4. The correlation between seeing competition with large farmers as a problem and gross farm sales was .25 $p < .001$.

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Appendix A Characteristics of the Sample

Table 1

Demographic Characteristics

Characteristic	Value	Number	Percent
Age of operator	17-35 years	41	(18.5)
	36-45	42	(19.0)
	46-55	67	(30.3)
	56-65	49	(22.2)
	66-78	22	(10.0)
	Total (Mean=49.1)	221	(100.0)
Sex of operator	Female	26	(11.8)
	Male	168	(76.0)
	Joint*	27	(12.2)
	Total	221	(100.0)
Ethnicity of operator	White American	150	(68.2)
	Mexican American	33	(15.0)
	Japanese American	16	(7.3)
	Other	21	(9.5)
	Total	220	(100.0)
Last grade in school completed by operator	2-8	39	(17.7)
	9-11	29	(12.7)
	12	78	(35.5)
	13-15	33	(15.0)
	16-20	42	(19.1)
	Total	220	(100.0)
Marital status	Married	195	(88.3)
	Cohabit	4	(1.8)
	Separated	3	(1.4)
	Divorced	5	(2.3)
	Widowed	5	(2.3)
	Never Married	9	(4.1)
	Total	221	(100.0)
Place operator lived before age 18	Same county	118	(53.9)
	Different county, same state	33	(15.1)
	Different state	61	(27.9)
	Foreign country	7	(3.2)
	Total	219	(100.0)

*Counted as male for analytic purposes.

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Table 1 (continued)

Characteristic	Value	Number	Percent
Size of area operator lived before age 18	Major urban center	16	(7.6)
	Midsized urban center	18	(8.5)
	Small town or rural	177	(83.9)
	Total	211	(100.0)
Farm background of operator	Operator raised on a farm	140	(63.6)
	Partially raised on a farm	39	(17.7)
	Not raised on a farm	41	(18.6)
	Total	220	(100.0)
Occupation before operating this farm	No previous occupation	14	(6.4)
	Farming	46	(21.0)
	Other work	159	(72.6)
	Total	219	(100.0)
Number of years operating this farm	1-5	57	(26.0)
	6-10	42	(19.2)
	11-20	39	(17.8)
	21-30	49	(22.4)
	31-60	32	(14.6)
	Total (Mean=16.7)	219	(100.0)
Commitment to farming	Indefinite	189	(87.5)
	Tentative	10	(4.6)
	Want to quit	15	(6.9)
	Undecided	2	(0.9)
	Total	216	(100.0)
Number of children living in household	0	65	(30.2)
	1	41	(19.1)
	2	58	(27.0)
	3	35	(16.3)
	4	7	(3.3)
	5	8	(3.7)
	7	1	(0.5)
	Total (Mean=1.6)	215	(100.0)
Main product	Beef	63	(28.5)
	Sheep	15	(6.8)
	Hogs	16	(7.2)
	Goats	3	(1.4)
	Poultry	1	(0.5)
	Rabbits	1	(0.5)
	Fruit	25	(11.3)
	Berries	4	(1.8)
	Hay	6	(2.7)
	Grain	15	(6.8)
	Vegetables	53	(24.0)
	Ornamentals	5	(2.3)
	Milk	6	(2.7)
	Other	8	(3.7)
	Total	221	(100.0)

Table 2

Acreage Inventory

Category	Acres 0	.05-10	11-50	51-100	101-300	301-1000	1001-8000	Total
Acres Owned (Mean = 141)	32 (14.5)	21 (9.5)	61 (27.6)	44 (18.9)	40 (18.1)	20 (9.0)	3 (1.4)	221
Acres rented out (Mean = 17)	191 (87.6)	7 (3.2)	10 (4.6)	7 (3.2)	2 (0.9)	1 (0.5)	0 (0.0)	218
Acres rented in (Mean = 121)	116 (52.5)	26 (11.8)	19 (8.6)	17 (7.7)	24 (10.9)	13 (5.9)	6 (2.7)	221
Total acres operated (Area = 235)	0 (0.0)	37 (17.1)	50 (23.0)	46 (21.2)	49 (22.6)	24 (11.1)	11 (5.1)	217
Acres in irrigated crops (Mean = 45)	64 (29.0)	42 (19.0)	53 (24.0)	24 (10.9)	37 (16.7)	1 (0.5)	0 (0.0)	221
Total acres in crops (Mean = 62)	28 (12.7)	49 (22.2)	67 (30.3)	30 (13.6)	44 (19.9)	3 (1.4)	0 (0.0)	221
Acres in pasture (Mean = 184)	80 (36.2)	30 (13.6)	52 (23.5)	24 (10.9)	13 (5.9)	10 (4.5)	12 (5.4)	221
Acres in woodland (Mean = 12)	150 (68.5)	33 (15.1)	23 (10.5)	7 (3.2)	5 (3.2)	1 (0.5)	0 (0.0)	219
Acres in recreational use (Mean = 6)	197 (90.0)	15 (6.8)	5 (2.3)	2 (0.9)	0 (0.0)	2 (0.9)	0 (0.0)	219

Table 3

Crop Inventory

Crop	Acres planted 1977							
	0	1-50	26-50	51-100	101-300	301-1000	1000+	Total
Hay (Mean = 28)	106	56	32	15	8	3	0	220
Grain (Mean = 12)	172	21	15	5	7	0	0	220
Orchard (Mean = 2.5)	186	29	3	1	0	0	0	219
Bush and vine (Mean = .08)	214	6	0	0	0	0	0	220
Vegetables (Mean = 19)	138	34	11	14	16	1	0	214
Ornamental (Mean = .11)	206	14	0	0	0	0	0	220

Crop	Tons sold 1977							
	0	1-50	26-50	51-100	101-300	301-1000	1000+	Total
Hay (Mean = 24)	165	5	23	12	6	5	0	216
Grain (Mean = 18)	187	4	12	13	3	5	0	217
Orchard (Mean = 8.0)	194	10	4	3	2	2	0	215
Bush and vine (Mean = .2)	214	5	1	0	0	0	0	220
*Vegetables (Mean = 80)	195	5	9	4	3	6	9	221
*Ornamentals (No. plants sold) (Mean = 385)	211	1	0	1	1	0	3	217

Crop	Units consumed 1977							
	0	1-10	11-50	51-100	101-300	301-1000	1000+	Total
Tons hay (Mean = 25)	120	10	38	32	6	0	0	206
Tons grain (Mean = 2.3)	191	9	8	3	0	0	0	211
Pounds orchard (Mean = 20)	191	0	5	4	4	4	0	208
Pounds bush and vine (Mean = 1.4)	215	0	2	3	0	0	0	220
*Pounds vegetables (Mean = 27)	171	1	2	6	2	1	3	188

*Due to overruns in the data field involving 1 to 4 cases, means may be slightly underestimated.

Table 4

Livestock Inventory

Category	Number 0	1-10	11-50	51-100	101-300	301-1000	Total
Beef cattle							
Number currently owned (Mean = 29)	101	32	58	16	11	3	221
Number bought 1977 (Mean = 8)	168	27	20	1	5	0	221
*Number born 1977 (Mean = 11)	129	34	43	9	5	0	220
Number sold 1977 (Mean = 17)	116	36	49	11	9	0	221
Number died 1977 (Mean = 1.4)	147	68	6	0	0	0	221
Number consumed 1977 (Mean = .7)	124	95	0	0	0	0	219
Sheep							
Number currently owned (Mean = 8.3)	188	6	13	9	4	0	220
Number bought (Mean = .9)	209	5	7	0	0	0	221
*Number born 1977 (Mean = 5.6)	190	9	11	7	3	0	220
Number sold 1977 (Mean = 10)	194	7	12	6	1	1	221
Number died 1977 (Mean = 1.4)	199	15	5	2	0	0	221
Number consumed 1977 (Mean = .2)	207	13	0	0	0	0	220
Pigs							
Number currently owned (Mean = 5.8)	188	21	3	3	6	0	221
Number bought 1977 (Mean = 2.56)	199	18	1	0	1	1	220
*Number born 1977 (Mean = 4.2)	204	2	4	2	6	0	218
Number sold 1977 (Mean = 10)	196	8	4	4	7	1	220
Number died 1977 (Mean = 1.1)	206	6	5	1	0	0	218
Number consumed 1977 (Mean = .3)	193	27	0	0	0	0	220

*Due to overruns in the data field involving 1 to 4 cases, means may be slightly underestimated.

Table 4 (cont.)

Category	Number						
	0	1-10	11-50	51-100	101-300	301-1000	Total
Other							
Milk cows currently owned (Mean = 1.7)	194	15	11	1	0	0	221
Goats currently owned (Mean = .4)	211	7	3	0	0	0	221
Riding horses currently owned (Mean = .7)	174	45	2	0	0	0	221
Draft horses currently owned (Mean = .2)	214	6	1	0	0	0	221
Fowl currently owned (Mean = 12)	177	7	25	4	4	2	219
Rabbits currently owned	215	3	2	1	0	0	221

Category	Number				
	0	1-100	101-1000	1000+	Total
Animal Products Sold					
Gallons of milk (Mean = 872)	202	2	6	9	219
Dozens of eggs (Mean = 31)	203	4	9	2	218
Pounds of wool (Mean = 92)	194	3	20	4	221

Appendix B Goals, Values, and Opninions

Table 1

Farming Goals

Response	Stated interest (multiple response)		Most important (single response)	
Live on a farm	179	(81.4)	93	(47.2)
Acquire assets and wealth	58	(26.4)	4	(2.0)
Supplement income	80	(36.4)	11	(5.6)
Only skill is farming	47	(21.4)	10	(5.1)
Preserve family farm	48	(21.8)	14	(7.1)
Cannot afford to leave	5	(2.3)	0	(0.0)
Like to grow things	20	(9.1)	2	(1.0)
Pleasure or hobby	30	(13.6)	1	(0.5)
Have something for retirement	10	(4.6)	3	(1.5)
Independence	22	(10.0)	9	(4.6)
Seclusion	11	(5.0)	3	(1.5)
Raise kids on a farm	24	(10.9)	9	(4.6)
Other or unable to choose	--	--	37	(18.8)
Total			197	(100.0)

Table 2

What Is Liked Most About Farm Life

Response	Operator		Spouse	
Farm work	44	(20.0)	18	(10.7)
Clean environment	37	(16.8)	32	(19.0)
Peace and quiet	22	(10.0)	40	(23.8)
Independence	91	(41.4)	31	(18.5)
Raise kids on a farm	4	(1.8)	12	(7.1)
Other	22	(10.0)	35	(20.8)
Total	220	(100.0)	168	(100.0)

Table 3

What Is Disliked Most About Farm Life

Response	Operator		Spouse	
Nothing	38	(17.4)	45	(26.8)
Not enough money	47	(21.6)	27	(16.1)
Uncertain prices	26	(11.9)	6	(3.6)
Tied down	14	(6.4)	11	(6.5)
Hard work	31	(14.2)	25	(14.9)
Labor problems	3	(1.4)	0	(0.0)
Hectic harvest	2	(0.9)	6	(3.6)
Bad weather	18	(8.3)	11	(6.5)
Insects	4	(1.8)	3	(1.8)
Social isolation	2	(0.9)	7	(4.2)
Mud and excrement	3	(1.4)	1	(0.6)
Other	30	(13.8)	26	(15.5)
Total	218	(100.0)	168	(100.0)

Table 4

Main Problem to Continuing Farming

Response	Number	Percent
Income	35	(16.2)
Production costs	29	(13.4)
Too small	13	(6.0)
Financing	12	(5.6)
Old age	12	(5.6)
Zoning	11	(5.1)
Need to upgrade	8	(3.7)
Crop failures	4	(1.9)
Lack of information	2	(0.9)
Other	52	(24.1)
None	38	(17.6)
Total	216	(100.0)

Table 5

Types of Information (Multiple Reponses)

Response	Useful	Middling	Not Useful	Total
Biological pest & weed controls	162 (74.7)	13 (6.0)	42 (19.4)	217
Chemical pest & weed controls	161 (74.2)	18 (8.3)	38 (17.5)	217
Soil testing	154 (70.6)	25 (11.5)	39 (17.9)	218
Animal care	152 (70.4)	20 (9.3)	54 (25.0)	216
Use of commercial fertilizer	150 (69.1)	20 (9.2)	47 (21.7)	217
Water use	148 (68.5)	16 (7.4)	52 (24.1)	216
Economies of farm management	138 (65.1)	23 (10.8)	51 (24.1)	212
Alternative energy	116 (54.0)	27 (12.6)	72 (33.5)	215
Intercrop rotation	105 (49.1)	26 (12.1)	83 (38.8)	214
Composting/recycling	86 (39.3)	41 (18.7)	92 (42.0)	219
Orchard care	69 (32.2)	13 (6.1)	132 (61.7)	214
Use of heavy machines	59 (27.3)	34 (15.7)	123 (56.9)	216

Table 6

Unmet Needs (Multiple Responses)

Response	Important	Middling	Unimportant	Total
Reducing supply costs	175 (81.4)	21 (9.8)	19 (8.8)	215
Reducing repair costs	163 (75.8)	14 (6.5)	38 (17.7)	215
Reducing machine costs	150 (69.8)	16 (7.4)	49 (22.8)	215
Better market opportunities	145 (66.8)	23 (10.6)	49 (22.6)	217
Information to upgrade farm	132 (62.9)	38 (18.1)	40 (19.0)	210
Access to irrigation water	118 (54.9)	21 (9.8)	76 (35.3)	215
Obtaining farm credit	101 (46.5)	29 (13.4)	87 (40.1)	217
Cooperation of neighbors	90 (41.7)	43 (20.0)	83 (38.4)	216
Obtaining hired labor	69 (31.8)	13 (6.0)	135 (62.2)	217
Obtaining off-farm work	50 (23.1)	28 (13.0)	138 (63.9)	216

Table 7

Marketing Problems (Multiple Responses)

Response	Important	Middling	Unimportant	Total
Price fluctuation	149 (69.03)	10 (4.7)	56 (26.0)	215
Lack of price information	107 (49.3)	14 (6.5)	96 (44.2)	217
Transportation costs	85 (39.5)	25 (11.6)	105 (48.8)	215
Lack of direct marketing opportunity	85 (39.4)	19 (8.8)	112 (51.9)	216
Lack of storage facilities	80 (37.0)	21 (9.7)	115 (53.2)	216
Cooperation from big operators	80 (36.9)	20 (9.2)	117 (53.9)	217
Meet grading requirements	73 (33.6)	19 (8.8)	125 (57.6)	217
Finding a broker	62 (28.4)	10 (4.6)	146 (67.0)	218
Inspection of sanitary regulations	47 (22.0)	21 (9.8)	146 (68.2)	214
Spoilage during transport	33 (15.3)	13 (6.0)	169 (78.6)	215

Table 8

Opinions

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
Farming in this country should be preserved as a way of life	130 (59.1)	78 (35.5)	7 (3.2)	5 (2.3)	0 (0.0)	220
Operating a family farm is a way of maintaining independence and freedom	89 (40.5)	107 (48.6)	11 (5.0)	11 (5.0)	2 (0.9)	220
Survival of the small farmer depends mainly on his own hard work	77 (35.2)	106 (48.4)	13 (5.9)	21 (9.6)	2 (0.9)	219
Family farming instills moral values not commonly found in other occupations	74 (33.8)	111 (50.7)	24 (11.0)	9 (4.1)	1 (0.5)	219
A person must give up some economic and social advantages to be a small farmer	39 (17.8)	115 (52.5)	20 (9.1)	43 (19.6)	2 (0.9)	219
The roles and uncertainties forced on the small farmer make it difficult to plan for the future	65 (29.7)	99 (45.2)	15 (6.8)	39 (17.8)	1 (0.5)	219
The government is a main source of problems for the small farmer	58 (26.6)	67 (30.7)	39 (17.9)	48 (22.0)	6 (2.8)	218
The world is run by a few powerful people and there's not much the little guy can do about it	45 (20.9)	76 (35.3)	28 (13.0)	52 (24.2)	14 (6.5)	215
The lot of the average man is getting worse	41 (18.7)	93 (42.5)	39 (17.8)	37 (16.9)	9 (4.1)	219
Public officials really aren't interested with the problems of the average man	41 (18.7)	69 (31.5)	48 (21.9)	59 (26.9)	2 (0.9)	219
Sometimes the best way to deal with a problem is to trust it to fate	5 (2.3)	49 (22.6)	21 (9.7)	102 (47.0)	40 (18.4)	217
I feel confident that I can make my plans work	55 (25.0)	132 (59.7)	17 (7.7)	13 (5.9)	3 (1.4)	220

Appendix C Mode of Operation

Table 1

Total Payment on Farm Debts in 1977

Amount	Number	Percent
$ 0	75	(34.9)
$ 16-$ 1,000	20	(9.3)
$ 1,100-$ 2,500	22	(10.2)
$ 2,600-$ 5,000	34	(15.8)
$ 5,100-$10,000	40	(18.6)
$10,596-$20,000	18	(8.4)
$20,737-$40,000	6	(2.8)
Total (Mean = $4,087)	215	(100.0)

Table 2

Amount of Production Loan

Amount	Number	Percent
$ 0	172	(77.8)
$ 100-$ 3,000	16	(7.2)
$ 4,000-$15,000	25	(11.3)
$22,000-$60,000	8	(3.6)
Total (Mean = $2,506)	215	(100.0)

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Table 3

Amount of Intermediate Loan

Amount	Number	Percent
$ 0	151	(71.2)
$ 1,000-$ 5,000	22	(10.4)
$ 5,700-$10,000	17	(8.0)
$12,000-$20,000	14	(6.6)
$21,000-$90,000	8	(3.8)
Total (Mean = $3,687)	212	(100.0)

Table 4

Amount of Mortgage

Amount	Number	Percent
$ 0	123	(56.4)
$ 7,000-$ 30,000	36	(16.5)
$ 32,000-$ 60,000	36	(16.5)
$ 61,000-$100,000	15	(6.9)
$100,000-$252,000	7	(3.2)
Total (Mean = $22,632)	218	(100.0)

Table 5

Current Market Value of Farm Machinery

Amount	Number	Percent
$ 0-$ 1,000	23	(10.8)
$ 1,200-$ 5,000	43	(20.3)
$ 5,500-$10,000	45	(21.2)
$10,500-$15,000	32	(15.1)
$18,000-$20,000	21	(9.9)
$22,000-$40,000	26	(12.3)
$40,136-$99,980	22	(10.4)
Total (Mean = $16,472)	212	(100.0)

Table 6

Current Market Value of Farm

Amount	Number	Percent
$ 0-$ 1,500	5	(2.4)
$ 5,000-$ 50,000	23	(11.1)
$ 51,860-$ 99,000	35	(16.8)
$ 101,000-$ 146,100	43	(20.7)
$ 150,998-$ 200,000	26	(12.5)
$ 201,122-$ 250,000	24	(11.5)
$ 251,498-$ 299,000	21	(10.1)
$ 301,000-$ 387,500	14	(6.7)
$ 403,000-$ 884,700	14	(6.7)
$1,115,000-$11,066,000	3	(1.4)
Total (Mean = $244,838)	208	(100.0)

Table 7

Self-Sufficiency

Self-sufficiency category	Food taken from own farm and garden	Repairs on buildings done by self	Repairs on machines done by self
0%	37 (17.5)	13 (6.3)	15 (7.3)
1-25	55 (25.9)	7 (3.4)	9 (4.4)
26-50	58 (27.4)	12 (5.8)	19 (9.2)
51-75	43 (20.3)	14 (6.8)	26 (12.6)
76-100	19 (9.0)	160 (77.3)	137 (66.5)
Total	212 (100.0) (Mean = 37.1)	207 (100.0) (Mean = 82.5)	206 (100.0) (Mean = 77.6)

Table 8

Person-Years of Hired Labor on Farm in 1977

Amount	Number	Percent
0	147	(79.5)
Less than 1	22	(11.9)
1	8	(4.3)
Greater than 1	8	(4.3)
Total	185	(100.0)

Table 9

Percent of Cost Saved by Exchange of Labor

Amount	Number	Percent
0	127	(62.3)
1-35	46	(22.5)
50-100	30	(14.7)
Total (Mean = 13.5)	204	(100.0)

Table 10

Amount of Time Operator and Spouse Spent in Farming and Nonfarm Work in 1977

Amount of time	Time in farming		Time in nonfarm work	
	Operator	Spouse	Operator	Spouse
Full-time	117 (53.4)	48 (22.5)	60 (27.5)	49 (23.1)
3/4-time	25 (11.4)	8 (3.8)	12 (5.5)	10 (4.7)
1/2-time	31 (14.2)	31 (14.6)	12 (5.5)	18 (8.5)
1/4-time	44 (20.1)	46 (21.6)	10 (4.6)	9 (4.2)
Minimal	2 (0.9)	47 (22.1)	5 (2.3)	8 (3.8)
None	0 (0.0)	33 (15.5)	119 (54.6)	118 (55.7)
Total	219 (100.0)	213 (100.0)	218 (100.0)	212 (100.0)

Table 11

Number of Children in Household Contributing to Farm Work

Amount	Number	Percent
0	116	(54.0)
1	46	(21.4)
2	36	(16.7)
3	8	(3.7)
4	6	(2.8)
5	3	(1.4)
Total (Mean = 0.8)	215	(100.0)

Table 12

Conditions of Employment

Condition	Operator (N = 106)	Spouse (N = 91)
Currently employed off the farm		
Off-farm income is a necessary supplement to farm income	89 (84.0)	50 (54.9)
Would be forced off the farm without off-farm income	73 (68.9)	27 (29.7)
Would prefer to work exclusively on the farm	71 (67.0)	40 (44.0)
Could find more time to work off the farm	16 (15.1)	23 (25.3)
Off-farm work interferes with farm work	47 (44.3)	16 (17.6)
Currently engaged in farm work only		
Farm duties allow time for off-farm work	38 (33.0)	57 (52.8)
Interested in finding off-farm work	15 (13.0)	19 (17.6)
Would interfere with farming if took off-farm work	72 (62.6)	48 (44.4)

Table 13

Reliance on Marketing Outlets

Degree of reliance	Direct to consumers		Local buyers		Auction		Cooperative		Contract to a company	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
A lot	59	(26.7)	67	(30.3)	57	(25.8)	31	(14.0)	35	(15.9)
Same	27	(12.2)	28	(12.7)	16	(7.2)	10	(4.5)	6	(2.7)
Little	19	(8.6)	10	(4.5)	6	(2.7)	5	(2.3)	2	(0.9)
None	116	(52.5)	116	(52.5)	142	(64.3)	175	(79.2)	177	(80.5)
Total	221	(100.0)	221	(100.0)	221	(100.0)	221	(100.0)	220	(100.0)

Table 14

Sources of Information

Degree of reliance	Friends and neighbors		Farm publications		Own experimentation		Past experience		County Agent (CES)		Commercial salesman	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
A lot	65	(30.4)	32	(15.9)	53	(28.6)	132	(70.6)	23	(11.6)	14	(7.7)
Same	53	(24.8)	60	(29.9)	42	(22.7)	31	(16.6)	66	(33.2)	13	(7.1)
Little	28	(13.1)	43	(21.4)	24	(13.0)	4	(2.1)	48	(24.1)	14	(7.7)
None	68	(31.8)	66	(32.8)	66	(35.7)	20	(10.7)	62	(31.2)	141	(77.5)
Total	214	(100.0)	201	(100.0)	185	(100.0)	187	(100.0)	199	(100.0)	182	(100.0)

Appendix D Sources of Income

Table 1

Income From Product Sales

Amount of income	Crop sales	Livestock sales	Animal product sales	Total gross income from product sales
$ 0	74 (33.8)	75 (34.2)	178 (80.9)	34 (1.4)
$ 27-$ 1,000	26 (11.9)	29 (13.2)	34 (15.5)	22 (10.0)
$ 1,044-$ 2,500	24 (11.0)	29 (13.2)	1 (0.5)	26 (11.9)
$ 2,520-$ 5,000	21 (9.6)	37 (16.9)	1 (0.5)	42 (19.2)
$ 5,075-$10,000	24 (11.0)	22 (10.0)	2 (0.9)	41 (18.7)
$10,300-$20,000	20 (9.1)	17 (7.8)	2 (0.9)	36 (16.4)
$20,128-$40,000	26 (11.9)	10 (4.6)	2 (0.9)	40 (18.3)
$40,400-$92,155	4 (1.8)	0 (0.0)	0 (0.0)	9 (4.1)
Total	219 (100.0) (Mean=$4,310)	219 (100.0) (Mean=$4,118)	220 (100.0) (Mean=$526)	219 (100.0) (Mean=$12,419)

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Table 2

Income from Nonfarm Work

Income	Wages earned by operator		Wages earned by spouse		Total income from wages and family business	
$ 0	133	(60.7)	141	(65.3)	83	(38.8)
$ 120-$ 5,000	20	(9.1)	28	(13.0)	25	(11.7)
$ 5,100-$10,000	20	(9.1)	22	(10.2)	36	(16.8)
$10,500-$15,000	25	(11.4)	16	(7.4)	23	(10.7)
$15,171-$20,000	13	(5.9)	5	(2.3)	27	(12.6)
$20,011-$31,100	8	(3.7)	4	(1.9)	22	(10.3)
$45,000-$70,720	0	(0.0)	1	(0.5)	2	(0.9)
Total	219 (Mean=$4,312)	(100.0)	216 (Mean=$3,015)	(100.0)	218 (Mean=$8,100)	(100.0)

Table 3

Income from Social Security
Pension or Annuity

Income	Number	Percent
$ 0	171	(78.8)
$ 100-$ 4,980	21	(9.7)
$ 5,064-$10,000	25	(11.5)
Total (Mean = $1,187)	217	(100.0)

Table 4

Net Farm Income in 1977

Income	Number	Percent	
$-98,148-$34,594	3	(1.5)	
$-25,954-$10,686	18	(9.1)	
$ -9,461-$ -5,030	28	(14.1)	107 (54.0)
$ -4,974-$ -2,568	27	(13.6)	
$ -2,469-$ -147	31	(15.7)	
$ 2-$ 2,354	35	(17.7)	
$ 2,768-$ 4,940	17	(8.6)	
$ 5,140-$ 10,000	22	(11.1)	91 (46.0)
$ 10,037-$ 22,300	16	(8.1)	
$ 97,645	1	(0.5)	
Total (Mean = $-1,059)	198	(100.0)	

Table 5

Household Net Nonfarm Income in 1977

Income	Number	Percent
$ 0	24	(11.6)
$ 7-$ 4,896	39	(18.8)
$ 5,108-$10,000	43	(20.8)
$10,200-$15,000	30	(14.5)
$15,155-$19,700	37	(17.9)
$20,100-$25,000	21	(10.1)
$25,427-$31,100	10	(4.8)
$40,000-$71,120	3	(1.4)
Total (Mean = $11,221)	207	(100.0)

Table 6

Household Total Net Income in 1977

Income	Number	Percent	
$-98,148-$-20,808	5	(2.7)	23 (12.2)
$-16,148-$- 300	18	(9.6)	
$ 63-$ 4,820	24	(12.8)	165 (87.8)
$ 5,390-$ 9.640	45	(23.9)	
$ 10,012-$ 14,874	35	(18.6)	
$ 15,020-$ 19,753	37	(19.7)	
$ 20,039-$ 24,589	13	(6.9)	
$ 25,268-$ 34,496	9	(4.8)	
$ 54,450-$104,880	2	(1.1)	
Total (Mean = $9,640)	188	(100.0)	

Appendix E Analysis of Variance Across Ten Classes of Farmers

Class	Age of operator	Operator lived in same county before age 18 1=yes, 0=no	Number of years operating this farm	Operator was in farming before operating this farm 1=yes, 0=no	Operator is retired from nonfarm occupation	Operator had previous experience as a professional manager 1=yes, 0=no	Last grade in school completed by operator	Operator member of civic organization
#1	46.84	0.55	16.36	0.17	0.09	0.05	11.84	0.09
#2	40.61	0.38	9.88	0.05	0.0	0.05	13.66	0.11
#3	61.64	0.29	22.76	0.17	0.64	0.05	10.94	0.05
#4	48.87	0.37	15.62	0.06	0.31	0.18	12.56	0.18
#5	43.94	0.61	12.05	0.05	0.05	0.05	13.94	0.36
#6	46.42	0.50	11.42	0.42	0.14	0.35	12.21	0.07
#7	60.13	0.60	30.00	0.21	0.30	0.08	11.91	0.04
#8	44.66	0.91	14.50	0.08	0.25	0.0	12.58	0.33
#9	48.88	0.77	21.62	0.50	0.0	0.37	11.88	0.22
#10	44.84	0.53	12.69	0.61	0.23	0.15	12.15	0.07
Overall mean	48.42	0.54	16.96	0.20	0.19	0.10	12.30	0.13
F	6.62	2.01	5.25	3.82	5.02	2.41	1.54	2.01
Sig.	0.0000	0.0397	0.0000	0.0002	0.0000	0.0129	0.1358	0.0397

Appendix E (continued)

Class	Number of acres owned	Total acres operated	Tons vegetables sold in 1977	Number of beef cattle currently owned	Gallons of milk sold in 1977	Farming is the only skill 1=yes, 0=no	One goal in farming is for pleasure or hobby 1=yes, 0=no	The most important goal in farming is economic 1=yes, 0=no	Total payment on farm debts in 1977*	Amount of mortgage
#1	141.93	245.81	73.80	40.44	394.96	0.32	0.05	0.26	7463.05	29139.88
#2	61.94	58.86	0.50	11.16	346.16	0.0	0.38	0.06	2624.55	26083.33
#3	57.73	84.19	0.0	8.94	91.76	0.0	0.05	0.26	191.76	2882.35
#4	48.92	117.92	1.78	16.25	552.18	0.18	0.18	0.30	1786.25	19818.75
#5	152.42	183.22	23.11	16.89	0.0	0.0	0.21	0.13	3852.52	19105.26
#6	68.46	142.92	84.00	11.57	553.21	0.14	0.14	0.54	4676.50	41857.14
#7	198.99	252.91	140.20	22.26	18.08	0.43	0.04	0.42	1586.17	3608.69
#8	43.54	103.68	8.00	14.25	0.16	0.08	0.08	0.50	1412.50	10000.00
#9	433.66	573.11	439.42	121.44	0.0	0.55	0.11	0.0	13592.88	64444.44
#10	84.92	197.15	315.33	49.07	12166.50	0.53	0.07	0.0	2914.76	36615.38
Overall mean	125.49	213.56	79.42	29.08	999.63	0.23	0.12	0.27	4246.06	23621.10
F	3.89	4.76	3.92	2.56	3.01	5.07	2.10	1.96	8.40	3.15
Sig.	0.0002	0.0000	0.0002	0.0085	0.0022	0.0000	0.0308	0.0476	0.0000	0.0014

* Indicates variable used in cluster analysis.

Appendix E (continued)

Class	Amount of intermediate loan	Amount of 1977 production loan	Current market value of farm machinery*	Current market value of farm	Percent of food consumed from the family farm and garden*	Percent of costs saved by exchanging labor with neighbors	Fertilizer and spray as a percent of total farm costs in 1977*	Cost of commercial fertilizer in 1977	Cost of insecticides in 1977
#1	7405.03	2789.42	27059.61	214057.08	43.03	10.90	15.71	1053.21	426.71
#2	1000.00	527.77	8050.00	240692.61	65.16	40.77	4.38	256.00	25.55
#3	294.11	5.88	5935.29	110494.70	55.35	25.47	6.44	204.52	35.35
#4	200.00	0.0	4665.62	103724.81	27.68	23.57	1.66	621.37	4.06
#5	1166.66	642.36	10105.26	145119.44	13.42	0.76	2.69	378.52	52.26
#6	2230.76	571.42	19464.29	178389.14	50.35	22.83	2.33	1058.85	78.21
#7	2260.86	608.69	15602.17	243340.65	18.26	5.00	5.06	623.82	79.60
#8	454.54	1000.00	9787.50	78864.33	14.00	13.18	2.27	908.33	109.58
#9	15911.11	13166.66	25681.77	277173.77	38.88	6.11	4.03	3227.66	443.33
#10	2409.09	8461.53	20001.92	209443.08	36.53	0.90	2.30	3836.53	301.30
Overall mean	3657.83	2224.63	16370.52	186423.35	37.13	14.56	6.86	1930.99	188.89
F	3.33	5.96	6.01	1.86	9.25	4.16	3.09	7.94	3.51
Sig.	0.0009	0.0000	0.0000	0.0593	0.0000	0.0001	0.0001	0.0000	0.0005

* Indicates variable used in cluster analysis.

Appendix E (continued)

Class	Cost of hired labor in 1977	Took 10% investment credit on federal income tax for 1977 1=yes, 0=no	Amount of time operator devoted to farming in 1977* 5=max, 0=none	Amount of time operator devoted to nonfarm work in 1977 5=max, 0=none	Amount of time spouse devoted to farming in 1977 5=max, 0=none	Amount of time spouse devoted to nonfarm work in 1977 5=max, 0=none	Extent of marketing direct to consumer* 3=max, 0=none	Extent of marketing through a cooperative 3=max, 0=none
#1	984.84	0.44	4.07	2.50	2.88	1.76	1.55	0.73
#2	282.94	0.23	2.72	4.16	2.11	2.83	1.50	0.88
#3	333.88	0.18	2.52	1.94	1.52	1.35	1.70	0.41
#4	143.50	0.13	4.50	2.18	2.06	2.53	2.81	0.18
#5	264.21	0.27	2.52	4.27	1.57	3.50	0.52	0.0
#6	1146.78	0.50	5.00	2.35	3.00	2.38	0.50	1.07
#7	465.43	0.21	4.95	1.34	2.86	2.54	0.69	0.39
#8	779.58	0.33	4.66	1.75	2.18	2.33	0.08	0.25
#9	431.77	0.88	5.00	1.55	4.00	1.66	0.0	0.33
#10	2006.76	0.69	4.92	1.00	3.23	2.07	0.15	0.92
Overall mean	701.48	0.37	4.00	2.40	2.53	2.24	1.12	0.54
F	1.88	3.54	28.50	9.46	4.16	2.92	10.84	1.84
Sig.	0.0574	0.0005	0.0000	0.0000	0.0001	0.0029	0.0000	0.0625

* Indicates variable used in cluster analysis.

Appendix E (continued)

Class	Extent of marketing under contract to a company 3=max, 0=none	Extent of reliance on information from friends and neighbors* 3=max, 0=none	Extent of reliance on information from farm publications 3=max, 0=none	Extent of reliance on information from county agent (CES) 3=max, 0=none	Extent of reliance on information from own experimentation 3=max, 0=none	Income from crop sales in 1977	Income from livestock sales in 1977	Income from animal product sales in 1977
#1	0.55	1.50	1.26	1.34	1.55	11561.26	5557.82	342.98
#2	0.61	2.16	2.11	1.72	2.29	1641.05	1433.72	464.11
#3	0.17	1.23	1.56	1.68	1.31	1392.17	1014.11	189.70
#4	0.0	2.56	1.57	1.30	1.38	3596.12	3209.87	152.43
#5	0.31	1.15	1.31	1.18	0.92	2219.00	2323.10	0.0
#6	0.78	1.64	1.28	1.07	2.30	6329.00	1501.85	556.35
#7	0.95	0.26	0.45	0.60	1.09	5480.13	3088.69	19.30
#8	0.41	2.50	1.00	1.10	0.88	6011.08	1985.00	22.16
#9	1.00	0.88	0.77	1.22	1.55	14491.66	11535.66	7.77
#10	1.15	1.92	1.15	0.66	0.75	18760.00	10732.00	5771.00
Overall mean	0.57	1.51	1.25	1.21	1.44	7332.52	4076.54	598.16
F	1.69	8.43	3.44	2.54	3.01	4.39	4.88	4.36
Sig.	0.0937	0.0000	0.0006	0.0092	0.0023	0.0000	0.0000	0.0000

* Indicates variable used in cluster analysis.

Appendix E (continued)

Class	Gross income from product sales in 1977*	Operator's income from nonfarm work in 1977	Spouse's income from nonfarm work in 1977	Income from social security, pension, or annuity in 1977	Operator's and spouse's income from nonfarm work and family business in 1977*	Household net nonfarm income in 1977	Net farm income in 1977	Household total net income in 1977
#1	17849.38	4226.75	2370.23	873.09	8197.94	10053.05	-1685.71	8363.60
#2	4041.00	10584.61	9125.05	222.22	19439.61	20255.05	-3069.83	17479.35
#3	2740.70	941.17	0.0	4128.00	1882.52	7584.66	144.70	7616.80
#4	7514.43	4721.25	2350.87	2141.18	7072.12	10693.93	-517.66	9513.20
#5	4603.94	11762.78	5064.68	607.05	17985.36	20816.77	-2837.94	17849.23
#6	9157.64	4245.57	2193.71	626.85	7087.50	9380.35	-2675.92	7426.00
#7	8993.34	891.30	1676.08	1881.65	2706.52	7467.60	1249.18	9056.22
#8	8021.58	2433.33	1895.83	1152.33	4579.16	8816.08	76.10	8135.40
#9	28434.33	466.11	637.50	0.0	1059.44	1607.37	-5559.44	-5901.62
#10	35889.46	423.07	447.53	0.0	870.61	2066.61	1473.07	3539.69
Overall Mean	12481.80	4373.98	2727.55	1204.43	7773.90	10509.17	-1250.46	9184.94
F	15.36	8.81	5.33	4.45	19.03	15.27	0.35	2.46
Sig.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9546	0.0117

* Indicates variable used in cluster analysis.

Appendix E (continued)

Class	Colorado	Hawaii	Montana	New Mexico	Oregon
#1	0.23	0.11	0.28	0.19	0.17
#2	0.05	0.05	0.38	0.0	0.50
#3	0.0	0.05	0.23	0.17	0.52
#4	0.12	0.18	0.12	0.06	0.50
#5	0.10	0.26	0.10	0.42	0.10
#6	0.21	0.07	0.42	0.07	0.21
#7	0.43	0.04	0.04	0.43	0.04
#8	0.25	0.33	0.08	0.33	0.0
#9	0.88	0.0	0.0	0.11	0.0
#10	0.69	0.07	0.15	0.0	0.07
Overall mean	0.25	0.11	0.20	0.19	0.21
F	6.92	1.59	2.25	3.30	5.16
Sig.	0.0000	0.1210	0.0204	0.0009	0.0000

* Indicates variable used in cluster analysis.

Appendix F Analysis of Variance by State

Variable	Colorado	Hawaii	Montana	New Mexico	Oregon	F	Sig.
Market value of machines	$ 23,070	$ 10,817	$ 14,893	$ 18,350	$ 12,548	3.3	.0114
Total payment on farm debts	$ 6,714	$ 3,548	$ 4,601	$ 2,360	$ 2,343	4.9	.0008
Gross income from product sales 1977	$ 23,940	$ 8,253	$ 10,063	$ 7,979	$ 8,211	16.4	.0000
Amount of time operator devoted to farming in 1977	4.7	3.4	3.8	4.1	3.5	10.2	.0000
Amount of time operator spent in nonfarm work in 1977	1.7	2.8	2.6	2.6	2.8	3.5	.0081
Amount of time spouse devoted to farming in 1977	3.7	1.9	2.4	2.0	2.0	14.8	.0000
Amount of time spouse spent in nonfarm work in 1977	2.2	2.4	2.1	2.9	2.0	2.0	.0390
Net nonfarm income in 1977	$ 7,039	$ 15,878	$ 11,795	$ 10,682	$ 12,646	5.0	.0007
Net farm income in 1977	$ -2,579	$ 1,377	$ -1,937	$ -172	$ -657	0.5	.7451
Net household income in 1977	$ 3,005	$ 18,207	$ 9,621	$ 10,668	$ 12,289	4.6	.0014
Market value of land and buildings	$131,666	$559,959	$170,266	$ 175,926	$134,102	2.2	.0594
Percentage of food consumed from own garden and farm	36%	7%	52%	24%	56%	26.0	.0000
Do canning and freezing	89%	25%	86%	71%	98%	2.2	.0000
Percentage of maintainance on buildings done by self	83%	48%	93%	83%	91%	14.9	.0000
Percentage of repairs on machinery done by self	89%	48%	79%	77%	79%	9.2	.0000
Acres owned	131	21	121	381	69	5.5	.0003
Acres operated	326	57	197	500	86	3.3	.0122
Amount of mortgage	$ 32,023	$ 26,039	$ 28,896	$ 3,769	$ 18,444	3.6	.0077
Years operating farm	16.0	12.4	12.9	26.5	16.3	9.0	.0000
Operator lived in same county before age 18	.64	.61	.37	.76	.32	6.8	.0000

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